

# PATENT ABSTRACTS OF JAPAN

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## (54) SEMICONDUCTOR COOLER

### (57)Abstract:

PURPOSE: To avoid any defective connection of a solder ball for enhancing the reliability thereof by a method wherein the elasticity and the water pressure of a cooling member are felt by a wiring substrate not to be applied on a semiconductor chip or a package.

CONSTITUTION: A spacer 5 is composed of, e.g.) a square flat part 5a bonded onto the lower surface of a diaphragm 3A formed of a heat conductive material and multiple, e.g., three each of holding members 5b erectedly formed downward around the flat part 5a. The holding members 5b are pressed against a wiring substrate 8 by the elasticity of the diaphragm 3A and the water pressure of cooling water running in a cooling water channel 6. Besides, specified gap C is set up to be formed between the lower surface of the flat part 5a and the upper surface of the flat part 5A by the spacer 5. This specified gap C is filled with grease 16 as, e.g., a soft conductive material. In such a constitution, the spacer 5 is pressed against the wiring substrate 8 by the pressure of cooling water running in the cooling water channel 6 of a water cooling jacket 2 and the elasticity of the diaphragm 3A.

